

EVIDENCE FOR GUSTATORIAL COURTSHIP IN A
HAPLOGYNE SPIDER (*HEDYPSILUS CULICINUS*:
PHOLCIDAE: ARANEAE)

by

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ABSTRACT

Gustatorial courtship, which is so far only known from two entelegyne families among spiders, is for the first time documented in a haplogyne spider, *Hedypsilus culicinus* Simon, 1893 (Pholcidae). The convergence to entelegynes is explained by (1) comparable mating position, and (2) body proportions.

KEY WORDS: gustatorial courtship, sexual selection, Pholcidae, *Hedypsilus culicinus*.

Gustatorial courtship, in which secretions from the male are transferred to the female's mouth and ingested during courtship and/or copulation is known in a variety of insects (e.g., THORNHILL & ALCOCK, 1983), opilionids (e.g., MARTENS, 1968) and erigonine (e.g., SCHAIBLE *et al.*, 1986) and theridiid spiders (VOLLRATH, 1977) (for additional references see SCHAIBLE *et al.*, 1986). In most cases a double function has been assumed: (1) the correct relative positioning of the sexual partners and maintenance of this position during copulation, and (2) the release of female behaviour or physiological responses that favor the male's chance of siring her offspring. Such a double function may explain the widespread co-occurrence of two morphological units: a cuticular modification of male parts that serves for the female to get a hold, and glandular tissue with openings at or near this cuticular modification.

This note reports for the first time apparent gustatorial courtship in a representative of the spider taxon Haplogynae, the tropical pholcid *Hedypsilus culicinus* Simon, 1893. The males of this species are easily distinguished from closely related species by a cuticular lobe on the clypeus (fig. 1). Spiders were collected in the biology building of the University of Costa Rica. Of six pairs that copulated in the laboratory, three were observed until the end of copulation (HUBER, in press), and three were freeze-fixed with liquid nitrogen for a study of copulatory mechanics (HUBER, in prep.).

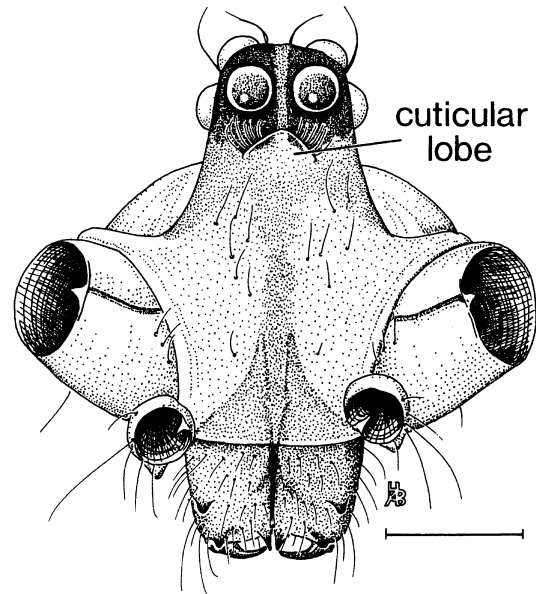


Fig. 1. Male *Hedypsilus culicinus* in front view, showing the cuticular lobe on the clypeus. Legs and pedipalps removed. Scale bar: 0.2 mm.

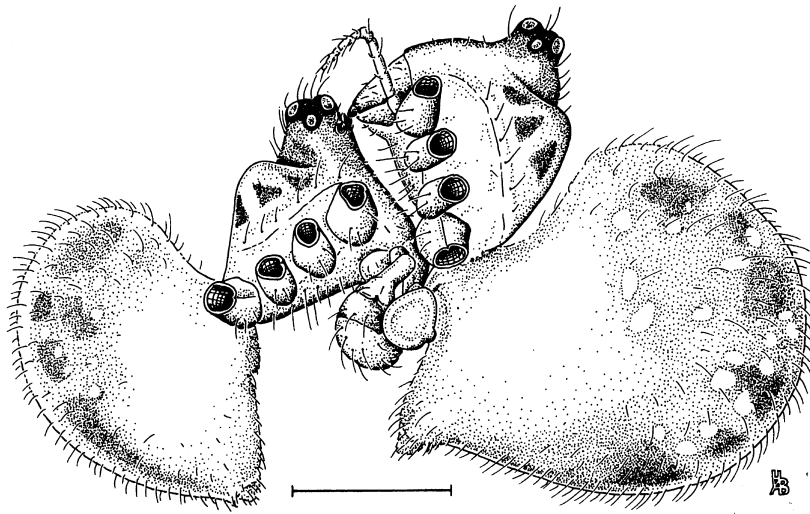


Fig. 2. *Hedypsilus culicinus* pair in copulatory position, drawn from a pair fixed with liquid nitrogen. Legs removed. The spiders actually copulate upside down. Scale bar: 0.5 mm.

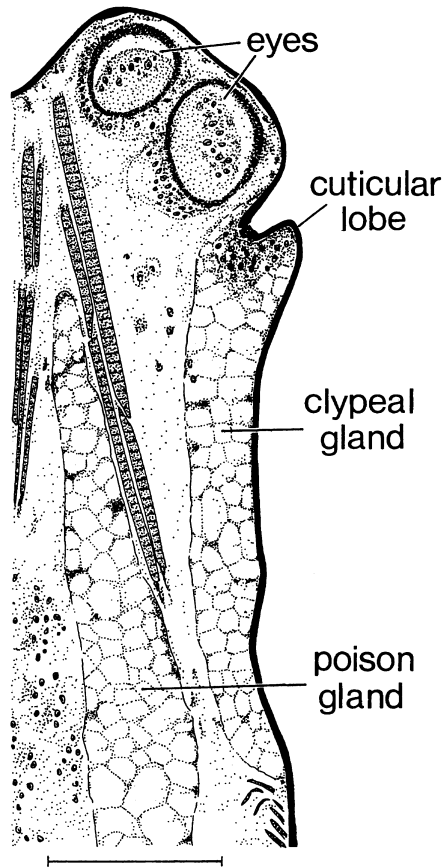


Fig. 3. Drawing of a sagittal semithin section through the cuticular lobe of a male *Hedysilus culicinus*, showing the extensive clypeal glands. Scale bar: 0.1 mm.

In these pairs, the female mouthparts were clearly in contact with the male clypeal modification (fig. 2). Serial sections revealed that the clypeus of the male (but not the female) is underlaid by a tissue that closely resembles the tissue of the poison glands (fig. 3). Two lines of evidence suggest a functional correlation of this tissue with the cuticular lobe: (1) a closely related (as yet undescribed) species lacks both the cuticular lobe and the underlying tissue, (2) the cuticle appears to be perforated in the furrow behind the cuticular lobe. Altogether this is considered evidence for glandular tissue that opens at the cuticular lobe.

The convergence to some erigonines and theridiids (representatives of the taxon Entelegynae) may be explained by the fact that pholcids mate in the same general position (mating position 2a from Gerhardt, 1921), which, given the proper proportions of male and female bodies, automatically brings the female mouthparts close to the male cephalic region. This is the case in many erigonines which may explain why in this group male modified head structures have evolved several times (SCHAIBLE *et al.*, 1986). In most spiders with this mating position the female mouthparts are well beyond the male cephalic region (for pholcids see figs in GERHARDT, 1921, 1924; HUBER, 1994; UHL *et al.*, 1995). It is apparently the extremely high clypeus in *H. culicinus* that makes contact possible at all. Thus, the morphology of the many other pholcids whose courtship and copulation behaviour are as yet undescribed, suggests that gustatorial courtship in pholcids is perhaps the exception rather than the rule.

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